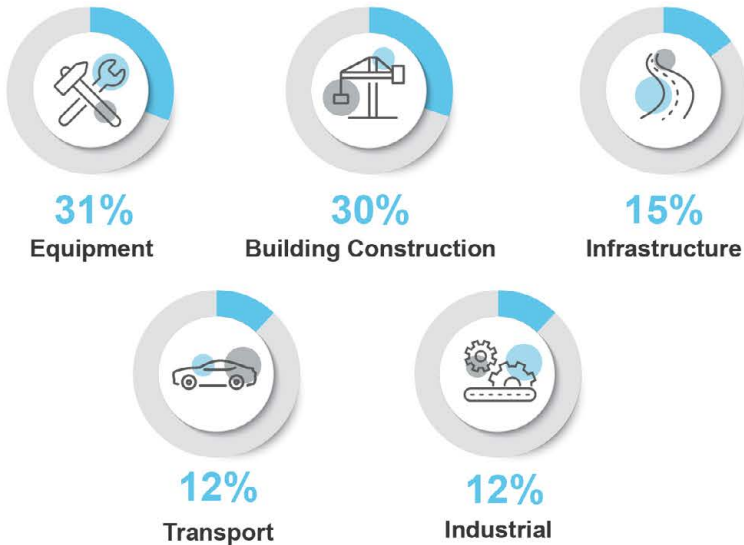


Copper

Major Australian copper deposits (Mt)



World consumption



Copper facts



- The average home contains **180 kg of copper**
- 80% of copper ever produced **is still in use today**
- Copper is vital in **electric vehicles**
- China consumes **48% of the world's copper**

Australia's copper



12.1 Summary

- Copper prices are expected to increase over the outlook period, as consumption outpaces production. Prices are forecast to average US\$5,990 a tonne in 2020, before rising an average 2.0 per cent each year to reach a projected US\$6,900 a tonne in 2025 (in real terms).
- Australia's copper exports are projected to rise from 929,000 tonnes in 2018–19 to around 1.1 million tonnes (in metal content terms) in 2024–25, driven by growing production from new and existing mines.
- As prices and output grow, Australia's copper export earnings are projected to lift from \$10 billion in 2018–19 to \$13 billion in 2024–25 (in real terms).

12.1 Prices

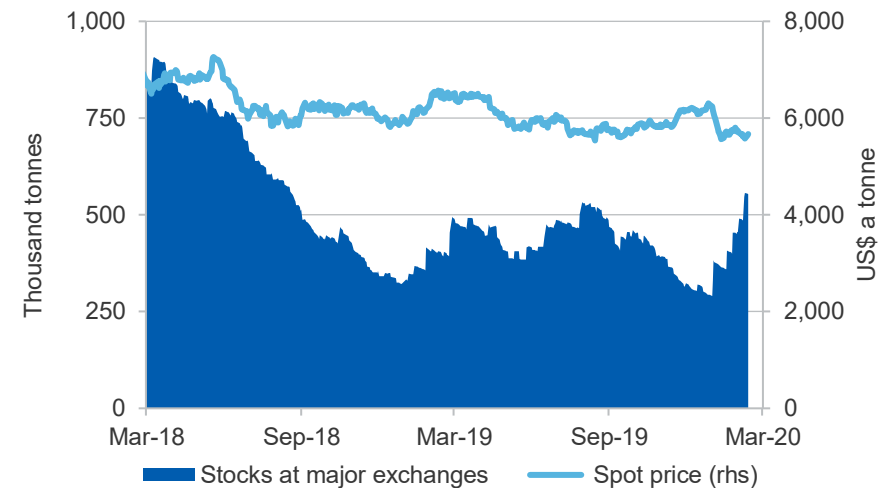
After a lacklustre 2019, copper prices continue to face headwinds

After a poor period in mid-2019, copper prices showed signs of recovery towards the end of the year, with confirmation of the US-China Phase One trade deal improving market sentiment. In 2019, the London Metal Exchange (LME) copper spot price averaged US\$6,000 a tonne, 8.0 per cent lower than the previous year (Figure 12.1).

So far, prices have continued to be challenged in 2020, with copper prices responding to the impact of the COVID-19 outbreak. Copper prices fell 6.2 per cent in the first two months of the year, affected by the rising US dollar, reduced industrial activity in China, as well as pessimistic sentiment around world GDP growth. Copper stocks declined over the last two quarters of 2019, but have started to build in 2020, amid stalling demand. Efforts to support the economy and boost activity, including lower interest rates and stimulus, have provided some support for prices.

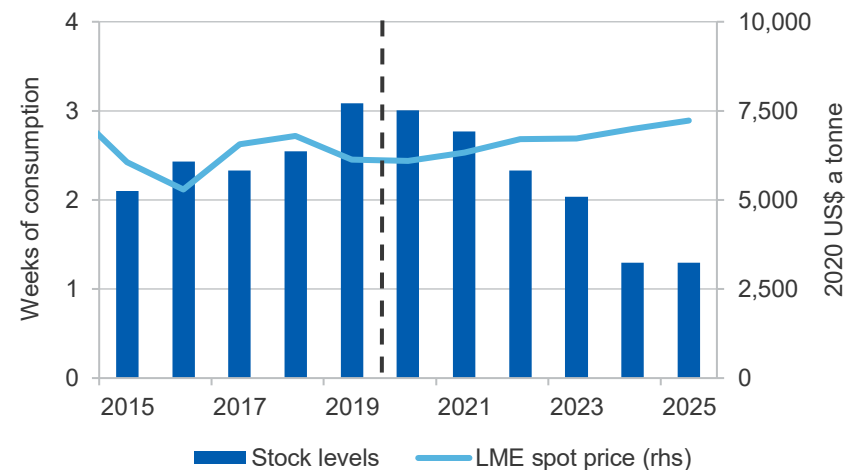
While the impacts of COVID-19 are still evolving, lower copper consumption in China over the start of the year could facilitate China's full year consumption growth to be negative in 2020. Copper price growth forecasts have consequently been revised down, and in 2020 the copper spot price is forecast to average US\$5,990 a tonne.

Figure 12.1: Recent copper prices and stock movements



Source: LME (2020) official cash price; Bloomberg (2020) inventories LME, COMEX, SHFE

Figure 12.2: Outlook for copper stocks and prices



Source: LME (2020) official cash price; Bloomberg (2020) Department of Industry, Science, Energy and Resources (2020)

Over the rest of the outlook period, rising consumption and constrained production are expected to drive inventories lower and result in a modest recovery in copper prices. Prices are projected to increase at an average rate of 2.0 per cent a year, to reach US\$6,900 a tonne by 2025, in real terms (Figure 12.2).

These price projections are sensitive to the balance of world copper production and consumption, which in turn will be affected by the pace of world economic growth. Markets will be influenced by US-China trade negotiations, the impacts of COVID-19 (including offsetting stimulatory policy measures), and changes in China's usage.

12.2 World consumption

Moderating consumption growth surrounded by risks

World GDP growth, and subsequently copper consumption, were weighed down by trade tensions and slowing activity in 2019. The stagnant consumption of 2019 could continue into 2020, as the impacts of COVID-19 filter through the world economy. World consumption is forecast to increase by 2.2 per cent in 2020, to reach 24 million tonnes (Figure 12.3).

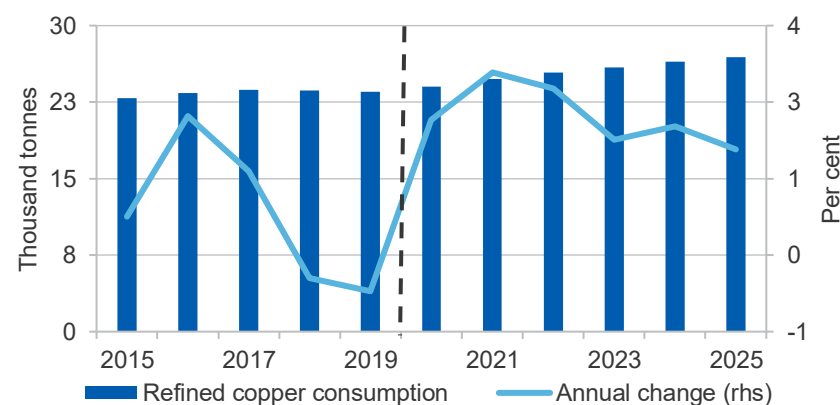
World copper consumption is expected to increase further over the remainder of the outlook period. The projection is heavily dependent on consumption in China, which consumes half of the world's copper. Declining macroeconomic indicators in December 2019 and January 2020 point to a weakening in China's consumption, which will likely be compounded by impacts related to COVID-19. These factors are expected to see China's copper consumption growth remain stagnant over 2020, at around 12 million tonnes. Provided conditions do not deteriorate further than current expected impacts, COVID-19 could reduce China's copper consumption by as much as 1-2 per cent over 2020, although stimulus spending may offset some of this decline. Delayed copper imports to China, slow restarts, and supply chain interruptions have reduced consumption in the March quarter. At the time of writing, industrial production and economic activity in China is assumed to recover in the

second half of 2020. The copper market is expected to remain in deficit over 2020, though the size of this deficit has been revised down, due to the impact from the COVID-19 outbreak.

Energy transition and growing applications to support consumption

In the medium term, copper consumption is likely to be bolstered by an ongoing energy transition towards lower carbon-intensive power generation and transport. Copper's conductivity, malleability and durability make it vital to electric vehicles, batteries and renewable energy generation. Electric vehicles (EV) use around 80 kilograms of copper, compared to around 22 kilograms used in internal combustion engines. Expanding EV charging infrastructure will also support demand for copper. The level of adoption, and subsequent consumption trajectories for these markets is difficult to determine with high precision, as the uptake is dependent on rapidly changing cost profiles and government policies. World copper consumption is projected to grow at an average 2.3 per cent a year over the outlook period, to reach 27 million tonnes in 2025. This projection is heavily dependent on China's future economic growth, as well as the health of the world economy and world trade.

Figure 12.3: Outlook for refined copper consumption



Source: World Bureau of Metal Statistics (2020); Department of Industry, Science, Energy and Resources (2020)

12.3 World production

Outages and declining ore grades weigh on copper production

World copper production contracted slightly in 2019, after healthy growth in 2018. In 2020, production is expected to grow again, supported by the ongoing ramp up of the Cobre Panama mine in Peru, which started production in October 2019. World mine production is forecast to expand to 21 million tonnes in 2020, up 2.2 per cent on 2019.

Copper production constrained by numerous factors over the outlook

Many of the world's major copper producers are facing production challenges. Rising electricity costs, civil unrest and changes to tax regimes are having a significant impact on operations and profitability in the current low price environment. Mine production is nonetheless projected to expand by an average 2.5 per cent a year over the outlook period, to reach 24 million tonnes in 2025 (Figure 12.4). However, this is subject to significant uncertainty, particularly on the downside.

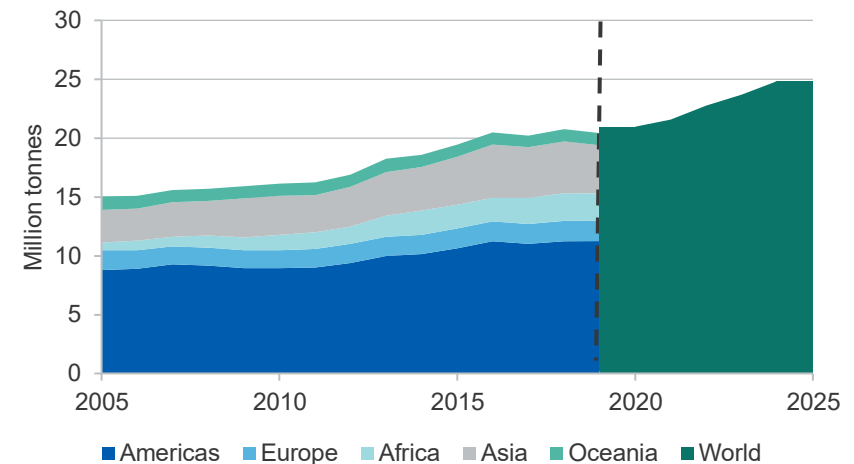
Chile is expected to maintain its status as the world's largest producer of mined copper over the outlook period. Production from the state-owned Codelco dropped in 2019, as the company dealt with falling ore grades, heavy rains and protests at the Chuquicamata mine. Codelco has plans for new mines and expansions over the next five years, but finance is yet to be obtained.

Copper prices, as well as the prices of common co-products like cobalt, will determine the pace of mine expansions and restarts over the outlook period. Low cobalt prices prompted the temporary closure of Glencore's Mutanda cobalt-copper mine in the Democratic Republic of the Congo in late 2019. This mine is expected to be in care & maintenance for the next two years.

Refined production growth dependant on China's capacity

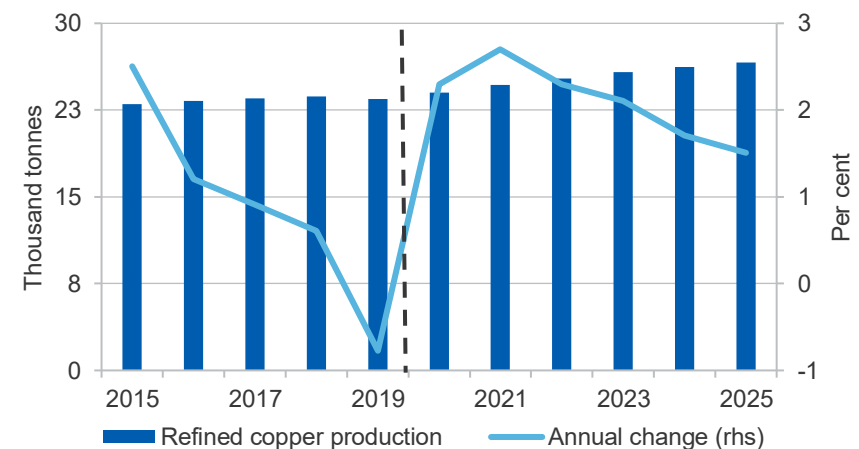
Output of refined copper is forecast pick-up in 2020, increasing by less than 1 per cent over the year to reach 24 million tonnes (Figure 12.5).

Figure 12.4: Outlook for copper mine production



Source: World Bureau of Metal Statistics (2020); Department of Industry, Science, Energy and Resources (2020)

Figure 12.5: Outlook for refined copper production



Source: World Bureau of Metal Statistics (2020); Department of Industry, Science, Energy and Resources (2020)

Production from China, which accounts for about 40 per cent of world refined production, is expected to be constrained, as COVID-19 impacts reduce operating capacity. Supply chain interruptions, including concentrate availability and the sale of sulphuric acid by-products, pose a threat to production rates. The impact of this has led to a downward revision in expected refinery output in 2020.

Refinery production is forecast to increase at an average annual rate of 1.8 per cent over the outlook period, to reach a projected 27 million tonnes in 2025. Over the outlook period, new refinery capacity is expected to come online in China, Peru, Russia and Indonesia. Refined copper production also faces expansion challenges, concentrate and electricity cost pressures, increasingly tight emission and sulphur capture limits, as well as generally tighter approval processes. New capacity in China may be delayed due to the ongoing impacts of COVID-19.

12.4 Australia

Short-term decreases overcome with higher prices and production

In 2019–20, subdued copper prices are expected to weigh on export earnings, which are forecast to fall by 1.6 per cent to \$9.6 billion in real terms. Further out, a gradual recovery in copper prices and expanding domestic production, are expected to support export earnings growth at an average 5.0 per cent a year, to reach a projected \$13 billion in 2024–25 (in real terms) (Figure 12.6).

Copper exports to grow, supported by higher production

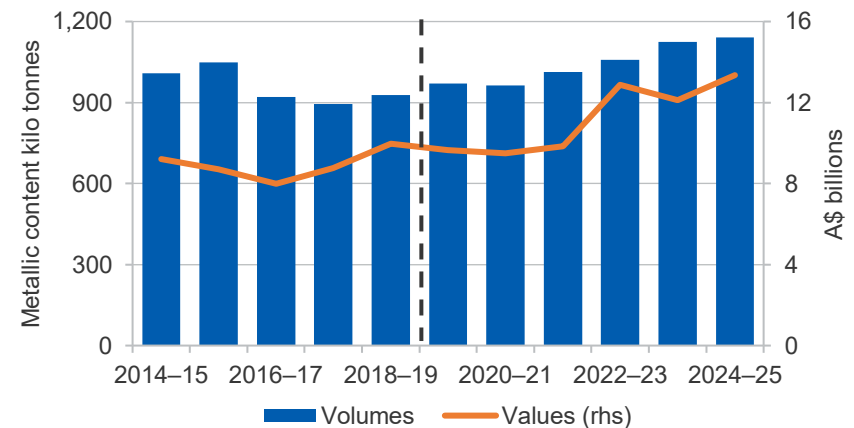
After significant growth in 2018–19, Australia's mined copper production is forecast to fall by 3.1 per cent in 2019–20, to 905,000 tonnes, as a number of mine closures take effect. Low copper prices continue to pose a risk to some of Australia's operations, as evidenced by the closure of Metals X's Nifty mine and suspended operations at EMR's Golden Grove mine, both in Western Australia, in late 2019.

As prices recover, production is expected to grow steadily, with new projects and expansions coming online. Copper production is projected to

grow by 2.6 per cent a year to exceed 1 million tonnes in 2024–25. A ramp-up in production at Oz Mineral's Carrapateena mine in South Australia — which started operations in late 2019, and has an annual capacity of 65,000 tonnes — is expected to contribute to this growth.

There are also a number of mine life extension projects underway, which are expected to come online over the medium term. These include Newcrest's Telfer and Sandfire's DeGrussa projects. Havilah Resources' Kalkaroo project, which is Australia's largest undeveloped open pit copper deposit, is also being investigated. Greenfield exploration projects, such as BHP's Oak Dam project in South Australia, are currently under review. Development of these projects will depend on improving world prices. Strong gold prices and booming gold production are also likely to have positive flow-on effects in areas where copper is co-produced.

Figure 12.6: Australia's copper export volumes and values



Source: ABS (2020) *International Trade in Goods and Services*, 5368.0; Department of Industry, Science, Energy and Resources (2020)

Interest in gold continues to help spur copper exploration

Copper exploration has continued to trend up, reaching \$125 million in the December quarter, 53 per cent higher year-on-year. An increase in gold interest could be spurring activity in co-existing gold and copper deposits.

Table 12.1: Copper outlook

World	Unit	2019	2020 ^f	2021 ^f	2022 ^z	2023 ^z	2024 ^z	2025 ^z	CAGR ^r
Production									
–mine	kt	20,512	20,965	21,532	22,566	23,132	23,443	23,805	2.5
–refined	kt	23,838	24,022	24,670	25,238	25,769	26,209	26,604	1.8
Consumption	kt	23,506	24,026	24,743	25,416	25,896	26,440	26,896	2.3
Closing stocks	kt	1 394	1 390	1 317	1 139	1 012	782	490	-16.0
–weeks of consumption		3.1	3.0	2.8	2.3	2.0	1.5	0.9	-17.9
Prices LME									
–nominal	US\$/t	6,005	5,989	6,500	7,081	7,699	8,010	7,734	4.3
	USc/lb	272	272	295	321	349	363	351	4.3
–real ^b	US\$/t	6,134	5,989	6,366	6,777	7,203	7,326	6,916	2.0
	USc/lb	278	272	289	307	327	332	314	2.0
Australia	Unit	2018–19	2019–20 ^f	2020–21 ^f	2021–22 ^z	2022–23 ^z	2023–24 ^z	2024–25 ^z	CAGR ^r
Mine output	kt	934	905	906	955	1,004	1,071	1,087	2.6
Refined output	kt	435	402	401	401	266	223	223	-10.5
Exports									
–ores and cons. ^c	kt	1,895	1,987	1,945	2,133	2,842	3,264	3,327	9.8
–refined	kt	396	404	409	409	271	228	228	-8.8
–total metallic content	kt	929	971	964	1,013	1,058	1,125	1,141	3.5
Export value									
–nominal	A\$m	9,770	9,611	9,673	10,264	13,735	13,250	14,971	7.4
–real ^d	A\$m	9,953	9,611	9,486	9,853	12,877	12,118	13,352	5.0

Notes: **b** In 2020 calendar year US dollars; **c** Quantities refer to gross weight of all ores and concentrates; **d** In 2019–20 financial year Australian dollars; **f** Forecast; **r** Average annual growth between 2019 and 2025 or 2018–19 and 2024–25; **z** Projection.

Source: ABS (2020) International Trade, 5465.0; LME (2020) spot price; World Bureau of Metal Statistics (2020) World Metal Statistics; Department of Industry, Science, Energy and Resources (2020)